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Use Cases of the Multi-Agency Cooperation in Cross-border Operations (MACICO) Project

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Abstract: - The Multi-Agency Cooperation In Cross-border Operations (MACICO) project develops a concept for interworking for security organisations in their daily activity. Considering both the end-users' requirements as derived from the compilation of surveys and the relevant bibliography, indicative use cases where MACICO could be applicable can be envisaged. In this study, a comprehensive analysis of different lower level deployment and testing stages and scenarios is included, while more complete use cases comprising complex multiple interactions among different elements of the MACICO ecosystem are presented in this study.

Key-Words: - Cross-border operations, Emergency communications, Interoperability, Next generation emergency service, Public safety, Public safety communications

1 Introduction

Public safety communications (PSC) comprises the primary condition and requirement for the effective intervention of the public protection and disaster relief (PPDR) sectors. The Multi-Agency Cooperation In Cross-border Operations (MACICO) project develops a concept for interworking for PPDR organisations in their daily activity [1]. This study presents use cases, where the functionality of a terrestrial trunked radio (TETRA) inter-system interface (ISI) could be beneficial. These scenarios will be located in the Finnish-Swedish-Norwegian border area. This area was chosen because all countries have a TETRA-network coverage on cross border area and it would beneficial to enable smooth cooperation between different authorities [2].

2 Case 1: Cross-border cooperation with police

Figure 1 present the situation, in which a heist takes place in Finland. The Finnish police begin the chase to catch the criminals who move across the border to Sweden. It is obvious that the criminals are going move across the border several times during the chase. Finnish police operation centre contacts the Swedish police operation centre and explain the situation. It is agreed that the Swedish patrol continues chase in Sweden and the Finnish patrol is allowed to

Fig. 1 Communication flow for police in cross border operation

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go across the border if needed. Swedish command centre activates the needed features in the network and police patrols are able to communicate with each other fluently.

The communication flow for police in this kind of cross-border operation consists of:

1. Finnish police detects a criminal car and starts pursuit. It seems obvious that the car (Lithuanian registered) tries to escape to Sweden over the border.
2. Finnish police operations centre contacts Swedish police operations centre, asking for coordination for the pursuit.
3. Swedish operations centre activates two TETRA voice groups over ISI in the Swedish network: one for FI-SWE co-operation, one for Finnish police force to continue to communicate in their home voice group.
4. Finnish and Swedish operation centres command the field units in the pursuit to use those two voice groups as their purpose is.
5. Police patrols are able to communicate with each other during the mission.

Figure 2 shows how the communication setup takes place:

1. Pursuit started in Finland using the national police home group: use Finland normal operational group.
2. Dispatcher of the operational group in Finland contacts Swedish police operations center via 1:1 call over ISI.
3. Both control centers activate the international co-op groups, which are interconnected via ISI.
4. Both control centers instruct the operative users in the pursuit to start using the interconnected groups (in addition to national group).
5. The Finnish control center instructs Swedish center to activate home group for Finnish visitor (pre-provisioned to be connected to the corresponding police home group in Finland).
6. Finnish operative unit crosses border and authenticates to the Swedish network (home authentication over ISI). The user is pre-provisioned to Swedish network with pre-defined (limited) user rights.
7. Interconnected groups are used in co-operation (agreed to use English language).
8. Finnish police national home group is used by migrated Finnish unit, when communication entirely with Finnish colleagues (in Finnish).

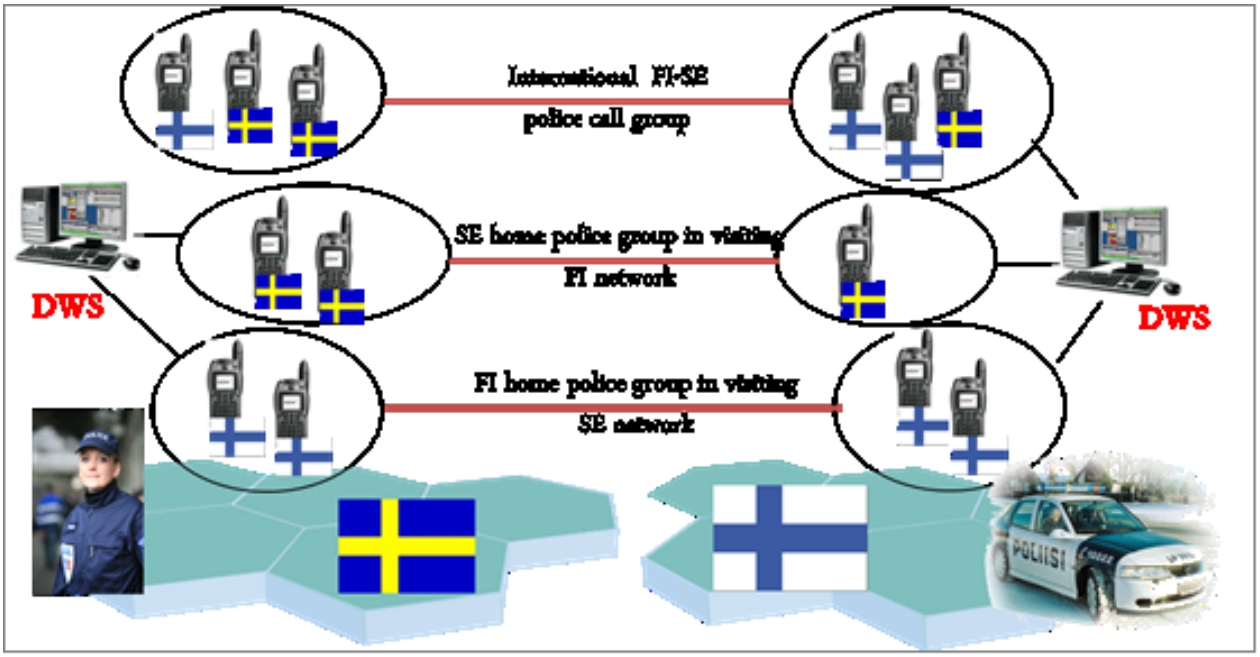

Figure 3 Communication setup for police in cross border operation

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9. The pursuit terminates in Sweden and the Finnish visiting operative unit returns to Finland making re-authentication in home network in Finland.
10. Finnish and Swedish operative centers agree to de-activate the groups over ISI.

3 Case 2: Cross-border cooperation with emergency vehicles

A Swedish person gets injured in the north of Sweden. He calls the EU unified emergency number 112 which connects to the Swedish Emergency Service center SOS Alarm because the call is made in the Swedish mobile network. SOS Alarm locates notice that a Finnish ambulance is the nearest one to the incident scene and orders help from the Finnish Emergency Service. Figure 3 illustrates the communication flow for emergency services in this cross-border operation:

1. Swedish person is injured in Sweden.
2. Swedish person makes an emergency call to Swedish emergency center (SOS Alarm) via commercial mobile network.
3. Swedish emergency center positions (AVL) nearest free ambulance to be a Finnish unit (being either in Sweden or near the border in Finland).
4. Swedish emergency center contacts Finnish emergency center to call for the Finnish ambulance to take the incident.
5. Finnish ambulance is ordered to go to the incident scene and give first aid.
6. Finnish ambulance goes to incident scene.
7. Swedish ambulance is called to the scene. Swedish ambulance takes the Swedish patient to hospital in Sweden.

The corresponding communications setup presenter in Table 4 is as following:

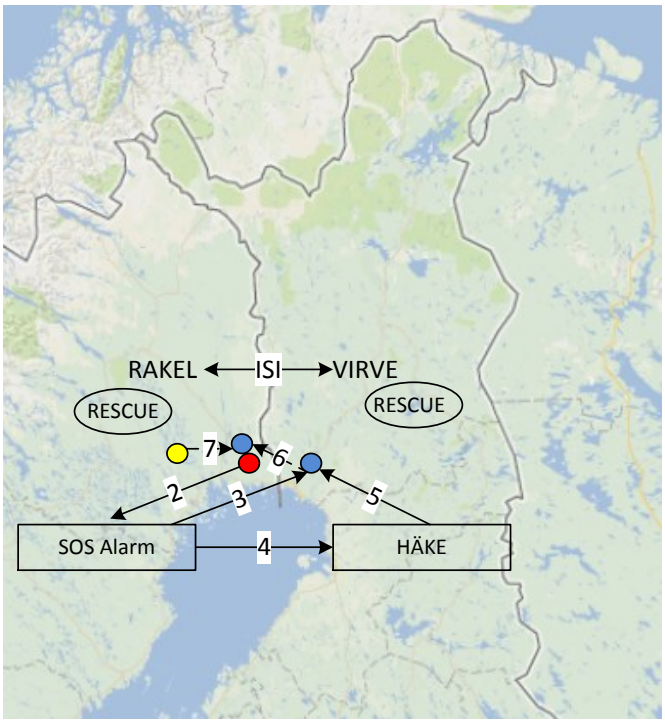

Fig. 3 Communication flow for emergency services in cross border operation

1. 112 call about an incident in Sweden, received by SOS Alarm. Swedish emergency center receives continuously real time AVL info of all ambulances in the area via TETRA SDS (AVL messages of ambulances in Finland are sent as SDS messages over ISI to Swedish emergency center).
2. Swedish emergency center contacts Finnish emergency center to dispatch Finnish ambulance via direct 1:1 call over ISI.
3. Finnish ambulance drives to the incident scene in Sweden, informs all other units and emergency centers of its new task, using the permanently active ISI-interconnected TETRA voice group (for ambulances).
4. Finnish ambulance gives first aid and informs via the ISI-interconnected TETRA group the operation centers and other units of the required next steps (need of transfer of victim to a hospital).

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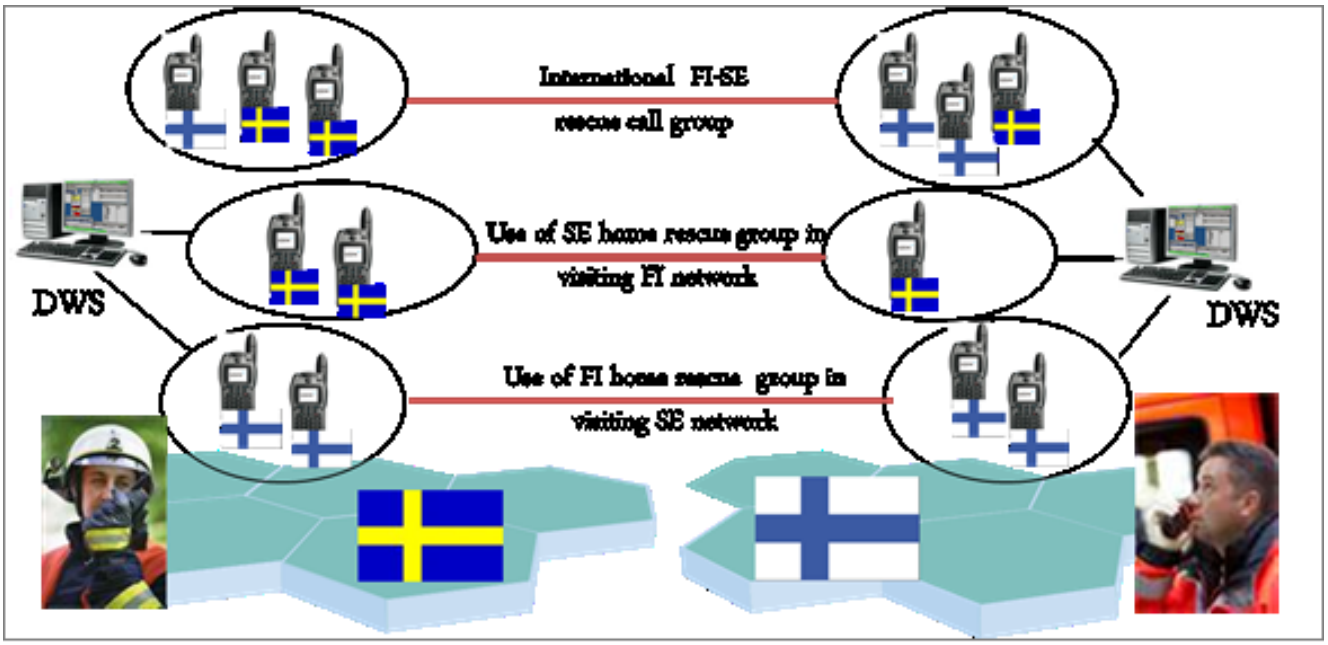

Figure 5 Communication setup for emergency services in cross border operation

5. Using the ISI interconnected group, Swedish emergency center dispatches the nearest Swedish ambulance to the incident place to transfer the patient to a Swedish hospital if needed. The nearest free Swedish ambulance, when called, may reside also on Finnish soil.
6. Swedish ambulance performs the task and informs Swedish emergency center of the completion of the task using the ISI-interconnected group.

4 Conclusions

MACICO's (Multi Agency Co-operation In Cross Border Operations) main objective is to reply to the short term needs of the Public safety organisations on radio communication systems for cross-border operations and for co-operative crisis missions. The organisations will communicate without functional perturbation and corrupting the security of the network. MACICO will also study interoperability issues that arise from the transition period between the existing networks and the next broad band generation. This study focuses on acquisition of use cases and system requirements. This study gathers all work material related to the interaction with operators and end-users. It is organised around a framework for gathering operational scenarios and requirements, as well as systematic methodology for harmonisation of needs at the European level.

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